Estimates of Personal Sector Wealth for South Africa*

WPS99-17

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May, 1999

Abstract: Without information on the market values of the main components of household wealth, it is difficult to understand the behaviour of aggregate consumer spending and of the broad money holdings of households. This paper constructs the first coherent set of aggregate personal sector wealth estimates at market value for South Africa. Our estimates derive from data published by the Reserve Bank on financial flows and various other capital market data, much of it at book value. Our methods rely, where relevant, on accumulating flow of funds data using appropriate benchmarks, and, where necessary, converting book to market values using appropriate asset price indices. The paper plots asset to income ratios for various asset classes, and by relating these to asset price movements and rates of return, throws some light on changes in the composition of personal sector wealth. The most striking changes have been the rise in pension wealth - overtaking housing wealth in the early 1990s, the rise in debt, and the relative decline of liquid assets and housing wealth since the early and mid-1980s, respectively. Areas of current ignorance are highlighted, particularly those concerning foreign assets, the unincorporated business sector and the nature of pension rights.

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* This research was funded by the Southern African Department, The World Bank, and by the Department for International Development, U.K., for the project "*New Monetary Policy Challenges for Sustainable Growth in South Africa*", grant number R7291. Janine Aron also acknowledges support from a Research Fellowship, Economic and Social Research Council, U.K. (Award Number H52427003594), and John Muellbauer acknowledges additional research support from the ESRC under grant number R000237500. We are grateful to Gavin Cameron for advice, and assistance from the South African Reserve Bank is gratefully acknowledged, particularly from J. Prinsloo, J. Van den Heever and D. Meyer.

1. Introduction

Without information on the market values of the main components of household wealth, it is difficult to understand the behaviour of aggregate consumer spending and of the broad money holdings of households. Neither the South African Reserve Bank (SARB) nor other government statistical agencies publish balance sheet wealth estimates on a market value basis, of the type produced by US Federal Reserve Board, the Bank of England and the Office of National Statistics in the UK, and comparable organisations in Japan and elsewhere. However, since 1970, the SARB has published flow of funds data[1] and information on households' holdings of local authority and public enterprise bonds, unit trusts, pension and long-term insurance funds, using a mix of book values and market values[2], and since 1990 publishes household debt data. From these data and various other sources described below, it is possible, with some difficulty, to assemble a profile back to 1970 of the main components of household wealth, or more precisely, personal sector wealth. The wealth estimates described below appear to be the first systematic attempt to construct such figures for South Africa.

Our methods rely, where relevant, on accumulating flow of funds data using appropriate benchmarks, and, where necessary, converting book to market values using appropriate asset price indices. Inaccuracies can therefore arise from errors in the basic data, in the benchmarks, and in the price indices used. Furthermore, there are gaps in three important areas. The first is personal sector ownership of foreign assets, the acquisition of which for many years was made difficult or illegal by South Africa's regime of capital controls. However, with recent relaxation of these controls, this asset class is becoming more important. The second is in the assets of unincorporated businesses included in the personal sector, though some of these assets are included in our housing wealth estimates. The third area concerns unfunded pension rights. The measurement of these rights in unfunded occupational and state pensions is a difficult problem in all economies[3] and estimated values of these rights are generally excluded from official wealth estimates.

Nevertheless, the assets and debts which we can measure with reasonable accuracy are the major part of the assets relevant for consumer spending decisions, and we demonstrate their relevance in Aron and Muellbauer (1998). Their changing composition is of considerable interest and contains clues about the behaviour of saving behaviour in South Africa more generally. The 1980s saw a significant decline in the ratio of liquid assets to disposable non-property income, but a rise in the ratios of debt, pensions and directly-held securities. The decline in real house prices since 1984 helps account for the decline in the housing wealth to income ratio, and why pension wealth overtook housing wealth in the early 1990s as the biggest of the different asset classes. Relative rates of return, given the structure of the tax system both for individuals and corporations, have also played a role in the evolution of the composition of personal sector wealth. We provide some graphical illustrations of these points.

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1 In South Africa's National Financial Account 1970-92 on an annual basis and quarterly from 1992 in the SARB Quarterly Bulletin.

2 In Capital Market Statistics of South Africa 1948-92 and the SARB Quarterly Bulletins.

3 Estimates for the UK have been made since the mid 1970s, see Stewart (1991).

The structure of the paper is as follows. Section 2 gives a brief methodological account of the basic techniques for converting flow of funds and book value asset data into market value estimates. Section 3 discusses in detail how our estimates were constructed for all the different asset classes. Section 4 presents plots of asset and debt to income ratios for the major categories. Graphical comparisons with key relative prices and rates of return provide important clues which help account for the changing composition of wealth. Section 5 summarises and concludes.

2. Methodology

For assets not traded in a secondary market and thus not subject to revaluation (e.g. bank and building society deposits), the standard stock-flow identity holds:

$$BA_t = BA_{t-1} + NPA_t \qquad (1)$$

where BA is the end-of-period stock and NPA is the flow of net purchases in the period.

Exactly the same identity governs the evolution of book value definitions of stocks where assets such as equity, bonds and housing are subject to revaluation. To derive market values, we have to start from some benchmark estimate of the market value of the stock, revalue it at the next period's price, and add net purchases during the period.

The revaluation adjustment can be explained as follows, in the context of quarterly data. Let A_{t-1} be the market value of an asset at the end-of-quarter t-1. Let π_{t-1} be the corresponding price index, proxied by the index for the last month of the quarter. Let NPA_t be purchases minus sales of the asset in quarter t and assume these are evenly distributed over the three months of the quarter. Then

$$A_t = A_{t-1}(\pi_t/\pi_{t-1}) + NPA_t\ (\Sigma_{i=1,3}\ \pi_t/\pi_{ti})/3 \qquad (2)$$

where i represents the month of the quarter, so that π_{t1} is the index for the first month of the quarter, and $\pi_{t3} = \pi_t$ is the index for the last month of the quarter, i.e. the end-of-quarter index. NPA_t is the flow of funds and with monthly price indices (2) can be implemented. Note that $(\Sigma_{i-1,3}\ \pi_t/\pi_{ti})/3 = \pi_t/H\pi_t$ where $H\pi_t$ is the harmonic mean of monthly prices in quarter t.[4] For a few of the assets we have access only to annual flow of funds data for 1970-91. For these we simply assume that the quarterly flows are one fourth of the annual flows.

In the case of purchases of short-term government stock where the effect of revaluation is small within a three month period, we replace equation (2) by the approximation

$$A_t \approx A_{t-1}\ (\pi_t/\pi_{t-1}) + NPA_t \qquad (3)$$

The other point of methodology concerns the estimation of price indices for fixed interest securities. For instance, the SARB only publishes a small range of yield data and no bond price indices. The price-yield relationship can be explained as follows, first for a short duration asset and then for a long duration asset. Suppose a two year stock pays in currency

[4] This could also be approximated by an arithmetic mean, $M\pi_t = (\Sigma_{i=1,3}\ \pi_{ti})/3$. Indeed, this index should be used if the net purchases indexed in constant price terms were evenly distributed over the months of the quarter.

units a coupon of c/2 percent half-way through each year, as well as at the end of each year, and pays 100 currency units at the end of the two years. The price-yield relationship is defined by

$$\pi^S{}_t = (c/2)/(1+r_t/2)+(c/2)/(1+r_t)+(c/2)/(1+r_t/2)\,(1+r_t)+(100+c/2)/(1+r_t)^2 \qquad (4)$$

where r is the annual percentage yield divided by 100, and π^S is the price of the short-term asset.

The analogous formula holds for stocks of longer duration. For long-term government bonds, where the average duration is n years (e.g. for South Africa, the average duration is about 13 years), and where for simplicity we ignore the fact that the coupon is paid twice a year, rather than once a year, the price is approximately given by

$$\pi^L{}_t \approx \Sigma_{i=1,n}\, c/(1+r_t)^i + 100/(1+r_t)^n$$
$$= (c/r_t)\,[1-1/(1+r_t)^{n+1}] + 100/(1+r_t)^n \qquad (5)$$

Using equations (4) and (5), we construct ratios of bond price indices of the form π_t/π_{t-1} and $\pi_t/H\pi_t$, where $H\pi_t$ is the harmonic mean for quarter t. In constructing price indices of the form π_t/π_{t-1}, we always assume the same coupon, c, at time t and at t-1. However, coupons tend to respond to the recent level of interest rates, and it is necessary to build in the gradual evolution of coupons. We assume, as above, that two years is the representative maturity of government stock in the short-term category, and take the evolving coupon to be determined by the moving average of the short-term yield in the previous twelve months. Similarly, for a thirteen year representative maturity for longer term government stock, we take the evolving coupon to be the moving average of the long-term yield in the previous six years. Then, holding the average coupon fixed for quarter-to-quarter comparisons only, we chain-link the quarter-to-quarter ratios into bond price indices.[5] Equation (2) can then be used to revalue assets and cumulate net acquisitions to convert book values to market values.

3. Wealth Data for South Africa's Personal Sector

The key asset categories are liquid assets, debt and various categories of illiquid financial and physical assets, including pension wealth, directly-held shares and bonds and housing. The stock of consumer durables, though less marketable than the assets mentioned above, is also of interest. The SARB have already compiled estimates of household debt (published from 1991, and previously unpublished), while estimates of housing wealth can be made from constant price stock estimates (unpublished data from the SARB) and data on house prices. Market values of the stock of consumer durables can be estimated from constant price stock estimates and durables price indices.

In what follows, the various stock benchmarks, price indices and the methods used in constructing quarterly market value wealth stocks to the end of 1997 are described for each type of asset. For household liquid asset stocks, plausible stock benchmarks are assumed and equation (1) is used to cumulate flow of fund components into stock estimates. The remaining assets (other than household debt) are all subject to revaluation. For many of these assets

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[5] To be precise, if Π_t is the desired price index, $\Pi_t/\Pi_0 = (\pi_t/\pi_{t-1})(\pi_{t-1}/\pi_{t-2}) \ldots (\pi_1/\pi_0)$ where π_{t-s}/π_{t-s-1} holds the assumed coupon at its t-s-1 value for s = 0, …, t-1 .

SARB publish only book value data, and the methodology explained in Section 2 is used to convert to market value.

3.1 Household Liquid Asset Stocks

Household liquid asset data consist of the flow of fund items 10-14: cash and demand monetary deposits (10), short/medium-term monetary deposits (11), long-term monetary deposits (12), deposits with other financial institutions (13), and deposits with other institutions (14) (National Financial Account). To convert these flows into stocks, we need one or more stock benchmarks. Note that the 1970s were high inflation years and interest rates on those elements of liquid assets with an interest return were typically substantially less than inflation. This means that the contribution of the end-1969 liquid asset stocks to, say, 1980 stock estimates, are small relative to the contribution made by the cumulative flows in the intervening years. Our procedure, therefore, is to make an initial guess at a 1969 benchmark, based on an assumption about the fraction of the broad money stock, M3, held by the household sector, to cumulate the flows to generate a series for 1969 to 1997, and compare these data with broad money stock data for the same years. The assumption is then made that the ratio of household liquid assets to broad money should be broadly similar in 1969 to the average of the years 1970-78 (i.e. taking as long a period as possible before the gold price shock, the floating of the exchange rate, and financial liberalisation). This gives a revised 1969 benchmark, which suggests a ratio of 0.85 of household liquid assets to M3, and equation (1) is applied again to cumulate the flows. Up to the end of 1991, this can only be done for end-of-year data. To obtain data for the remaining quarters of each year, we use the aggregate M3 data to interpolate.

3.2 Government and Public Enterprise Asset Stocks

Government and public enterprise stocks is the first set of assets for which we carry out the adjustments to market value. The set consists of flow of fund items, short-term government stock (19), long-term government stock (20), non-marketable government bonds (21), securities of local authorities (22), and securities of public enterprises (23) (National Financial Account). Here we need not only benchmark(s) for stocks at market values, but also price indices to adjust the figures for market revaluation.

Beginning with non-marketable government debt, largely of short duration, asset revaluation can be argued not to be relevant, suggesting cumulating the book value data. However, with any plausible assumptions on a 1969 benchmark asset figure, the cumulated asset totals obtained using equation (1) become negative after 1991. This suggests serious underestimation of net acquisitions in earlier years. This type of inconsistency would have come to light if the SARB had constructed regular balance sheets as well as the flow of funds data. In the circumstances, we have little choice but to omit this asset, whose holdings fortunately appear to be small (for instance, relative to liquid assets).

The benchmarks for the other components of the flow of funds above are derived as follows. Table 7 in Capital Market Statistics gives net issues of total government stock, beginning in 1961. Making some allowance for net issues in earlier years, and for asset revaluation during 1961-69, this suggests that in 1969 perhaps R3,750 million of total government stock was outstanding. The main holders of government stock in these years were pension funds, and for long-term insurers and government pension funds about 80 percent of

these holdings were long-term. Thus, we assume for the 1969 benchmark that 80 percent comprised long-term stock and 20 percent short-term stock. Next, we estimate the household sector shares of these totals at 10 percent. This is roughly the flow of funds estimate of households' average transactions in government stock in 1970-78 as a proportion of total transactions. This gives household sector benchmarks of R75 million for short-term assets and R300 million for long-term assets.

Quarterly figures from 1970 on personal sector ownership of securities of local authorities, are published in Table 10 of Capital Market Statistics, and, for, public enterprises, in Tables 9 and 11.

All these figures are on a book value rather than on a current market value basis, and require the revaluation adjustment using equation (2). In the 1960s, short-term yields rose from around 4 percent in 1963-4, to 5 percent by end 1965, to a peak of 5.5 percent in mid-1968, and settled at 5 percent in 1969. This suggests a small positive revaluation in 1969 relative to 1968 and a small negative revaluation relative to the early 1960s. Given these facts, we can take the 1969 book values as reasonable approximations to the market values.

Further inaccuracies of approximation arise because the SARB do not publish price indices for any of the above assets. Therefore, before applying equation 2, we have to construct approximations to price indices from published yield data using equations (4) and (5), as explained in Section 2. From Table 1, Capital Market Statistics, there are monthly yield data on short-term government stock (an average of 0 to 3 years' maturity), and for long-term government stock (an average of 10 years' maturity and greater). Price indices for local authorities and public sector enterprises are derived using the price-yield relationship in equation (5), on the assumption that the representative stocks have a duration of ten years. Missing data before 1981 on local authorities' yields are derived from fitting a regression relationship using yields on long-term government stock on the years for which the data exist.

3.3 Corporate Bonds and Equities

The next asset category from the flow of funds is 'other loan stock and preference shares' (24) (National Financial Account), which we take to be largely corporate bonds. To obtain a benchmark we estimate that around R400 million was outstanding in 1969 (based on estimates from net issues in Table 7 of Capital Market Statistics). Assuming the flow of funds estimate of household sector transactions volume in this category is broadly proportional to total average transactions volume in 1970-78, suggests a household sector benchmark in 1969 of around R120 million. We assume yields of 2 percent above those of 10 year or greater maturity government stock[6], and apply equation (2) to revalue assets and cumulate net acquisitions to convert book values to market values, after deriving a price index from equation (5).

For ordinary shares (asset category 25 in the National Financial Account), finding the appropriate benchmark for 1969 is especially controversial. Unit trusts (mutual funds), first established in 1965, had accummulated a market value of R470 million in equities by the end of 1969. Bryant (1987) reports that the fourth triennial survey of share ownership in 1969 showed 234,000 adult white South Africans owning both shares and unit trusts, while 93,000 had unit trusts only. The 1972 survey followed three years of a relatively poorly performing stock market, in which the numbers holding unit trusts are unlikely to have risen[7], showed

[6] This is broadly consistent with data on these yields from 1974 onwards.

[7] Indeed, net disinvestment occurred, according to Table 24, Capital Market Statistics.

416,000 persons holding either or both shares and unit trusts. This suggests that in 1969, perhaps 200,000 held shares only. The holdings of these investors surely outweighed those of the 234,000 who held unit trusts as well and the 93,000 holding unit trusts only. The reasons are two-fold: firstly, small investors need the diversification brought by unit trusts much more than large investors; and secondly, unit trusts were a recent phenomenon, whereas share ownership had been established for much longer. The question remains by how much the figure of R470 million should be scaled-up to give an end-of-1969 benchmark, for total equities of households.

In principle, one might look at four different kinds of information to answer this question. The first is annual net share purchases from the flow of funds by comparison with unit trusts purchases. For 1970-1992, these are of similar orders of magnitude, suggesting direct ownership of shares is not hugely in excess of ownership of unit trusts. However, it is possible that turnover is particularly low for direct owners of shares who are part of the household sector.

A second source of information is the market capitalisation of equities. Annual reports of the Johannesburg Stock Exchange suggest a March 1970 valuation of around R23 billion. Yet our discussion below suggests long-term insurers held only around R762 million worth of equities at the end of 1969, and private pension funds only R494 million, while official pension funds did not invest in equities at all at that time. Other owners of equity included foreigners, banks and other financial institutions, and central and provisional government. The National Financial Account beginning in 1970 shows large net transactions for these sectors, tending to overshadow those of households (excluding pension funds holding assets on behalf of households).

A third potential source of information from the National Accounts is that property income of the household and unincorporated business sector in 1970 was around 20 percent of total personal income. However, we have no information on how this breaks down into dividends, net interest, and the rent and profits of unincorporated enterprises.

Finally, estimates of household wealth can be made from estate duty returns. The single South African study by McGrath (1982) is based on returns for one province only for 1975, and gives no information on average wealth holdings by type of asset. In crude orders of magnitude, it suggests total household wealth in 1975 may have been perhaps one and a half or twice the market capitalisation of equities of around R31 billion in 1975. However, this total includes farms, houses, fixed interest securities and unincorporated business, as well as equities.

In the light of these diverse pieces of information, we have chosen a benchmark for the end of 1969 for ownership of ordinary shares of R2350 million, which is five times the market value of unit trusts at this time.

3.4 Pension stocks

The next financial asset class from the flow of funds is the largest: 'interest in retirement and life funds' (29) (National Financial Account). In addition to the flow of funds items, there are data on the asset holdings of private self-administered pension and provident funds, official pension funds, and also long-term insurers, for whom around half of assets are held for pension liabilities.

(i) Private Self-Administered Pension Funds

Turning first to private self-administered pension and provident funds, there are data on the portfolio composition of assets quarterly back to 1963, and annually back to 1958, both on a book value basis (see Table 20, Capital Market Statistics). There are seven groups of assets subject to revaluation. The history of yields and share prices suggests relatively little change in the 1950s up to the end of 1961, except that the December, 1961 level of the JSE all share price index is around 25 percent above levels in the previous five years or so. We therefore take end-of-1961 book values as market values for all assets except equities. For the latter, we scale-up the book value by 25 percent.

We then apply equation (2) to adjust the book values of each of the seven groups of assets to market value. First, price indices have to be constructed for the various categories. The price index for "government stock" is constructed as a weighted average of the price indices for short-term and long-term stocks, described above in section 3.2, using an 80 percent weight for long-term stocks. The price indices for "local authority", "public enterprise" and "corporate" bonds were described above in section 3.3. The Johannesburg Stock Exchange (JSE) index of all share prices is used for "ordinary shares". The category "other assets" includes some foreign assets. Evidence on the same category from long-term insurers suggests that revaluation is here relatively small, of the order of ten percent of domestic equity revaluations. We therefore assume that ten percent of these holdings are subject to revaluation and use the JSE share price index for this purpose. The house price index for medium-sized houses (from ABSA Bank Ltd., South Africa) is used for "fixed property" from 1966. For 1961-65, in the absence of other data, this is chained to the South African consumer price index (CPI).

It is noteworthy that adjusting to market value makes a considerable difference, for example, suggesting an end-1997 market value which is 65 percent higher than the reported book value.

(ii) Long-Term Insurers

For long-term insurers, for whom around half of total assets correspond to pension liabilities, quarterly data on the portfolio composition begin in 1963, and annual data in 1946 (see Table 13, Capital Market Statistics). For the most part, we can follow the procedure outlined above, and then apportion revalued assets according to the ratio of pension business to total liabilities (this is available annually back to 1973, and we use the 1973 ratio in earlier years -see Table 14).

However, there is one quite serious difficulty. Between the third quarter of 1985 and the third quarter of l991, some insurers reported at market values and others at book values, while from the fourth quarter of l991, all insurers were required to switch to the market value basis. Unfortunately, we do not know the proportions which reported on either basis, though there are some contradictory clues. For example, for ordinary shares, there is a jump from R8,647 million at book value in June, 1985 to R11,252 million in September,1985, on a mixed reporting basis. We do not know net acquisitions between these dates, but on plausible assumptions, around 15 percent of ordinary share holdings may have switched to being valued at market prices. However, between September, 1987 and December, 1987, when the JSE all share price index fell from 106 to 71 (a 33 percent fall), reported ordinary share holdings fell by 43 percent, which seems inconsistent with only about 15 percent or so of insurers reporting at market value. The puzzle deepens when we find that between September, 1991 and December, 1991 - when the switch to full market valuation occurred - the reported ordinary share holdings rose from R54,662 million to R104,532 million, suggesting that only a small proportion were reporting at market value in September, 1991.

Unless there is some other gross data inconsistency, only one hypothesis seems able to explain these paradoxes. Suppose that in the first quarter of 1987, more insurers switched to the market value basis. Then more of the 40 percent rise in ordinary share holdings from March to September 1987 could be explained by the 25 percent rise in the JSE index. However, after the October, 1987 world stock-market crash, the market valuation basis would have seemed much less attractive. This suggests that some insurers, having only recently adopted the market value basis, switched back to book value in reporting to the Registrar of Insurance. We therefore assume the following pattern: 15 percent of assets switch to market value in the third quarter of 1985; this rises to 30 percent in the period between the first quarter of 1987 and the third quarter of 1987; it then falls back to 15 percent in the fourth quarter of 1987, where it remains until the fourth quarter of l991, when it jumps to 100 percent. Given movements in the JSE index, this results in an implied pattern of net acquisitions which is not too improbable. With these assumptions we can then construct quarterly market value estimates from 1962 to 1997. As noted above, these are then apportioned to pensions using the ratio of pensions to total liabilities.

(iii) Official Pension Funds

Finally, for the third type of pension fund, official pension funds, there are annual book value portfolio composition data back to 1974 (Table 18, Capital Market Statistics). These funds started investing in corporate bonds, ordinary shares and fixed property only in 1990, when quarterly data begin. Prior to 1990, government, local authority and public enterprise bonds accounted for more than 85 percent of total assets invested. Prior to 1974, there are annual data for total assets at book value, going back to 1948 (Table 21, Capital Market Statistics).

We then proceed as follows. In March 1974, 97 percent of official pension funds at book value were invested in public fixed interest securities of various kinds. Assuming the same percentages applied before 1974, we can estimate the flow of acquisitions before 1974. Thus, we have a flow of acquisitions for each type of asset in each year to 1989, which can be interpolated linearly to a quarterly basis. From 1990, we have genuine quarterly data for assets, now also including corporate bonds, equities and property. Assuming book and market values were approximately equal at the end of 1961 to give us 1961 benchmarks, we can then use equation (2) to revalue assets and cumulate net acquisitions to convert book values to market values.

3.5 Private Housing Stocks

Next, we turn to the construction of private housing wealth estimates. As mentioned above, there are annual estimates of the private housing stock in 1990 prices from 1960. On the assumption that the underlying land value of a typical home adds one third[8] to the value of the house, these estimates are scaled up by one third, and then multiplied by the average price of a medium-sized housing unit, divided by the average price in 1990 (data from ABSA Bank Ltd.). Although the personal sector accounts for the great majority of private housing wealth, the private sector figure will overestimate personal sector housing wealth. However, since there is no estimate of land and non-residential buildings for unincorporated businesses - whose prices will tend to move broadly similarly to house prices - some of these assets will perforce be reflected in the personal sector housing wealth estimates.

[8] This was regarded as plausible by a small sample of South African economists.

3.6 Assets of Unincorporated Businesses

As mentioned above, no capital formation estimates are published separating out the unincorporated business sector from private enterprises as a whole. Nor are profit figures for unincorporated businesses published separately. Yet, given South Africa's large farming sector, one might expect this sector to be of significant size.[9] It seems likely, given changes in corporate and personal tax systems and inflation, during the 1970s and 1980s, that there was a tendency towards the incorporation of previously unincorporated businesses. Indeed, this may be part of the reason why corporate saving rose in the 1980s, while personal saving declined. But this must remain conjecture for the present.

3.7 Foreign Assets and Liabilities

Although there appear to be small elements of foreign assets among the assets of long-term insurers, no SARB estimates exist of personal sector ownership of foreign assets. Yet despite exchange controls, there were inevitable loopholes, particularly for the business sector, allowing funds to be taken out of the country. There are several possible channels of capital outflow, and well-known difficulties in estimating the various measures of capital flight. Several authors have attempted to estimate the extent of capital flight from South Africa for the 1970s and 1980s, see for instance Smit and Mocke (1991), Kahn (1991) and Rustomjee (1991). The dominant mechanism addressed by the latter two authors is export under-invoicing, and a spirited criticism of the data and techniques to obtain the resulting large estimates of capital flight through this channel can be found in Wood and Moll (1994).

Even if such estimates were accurate, these flow estimates would need to be converted into stocks without knowing their portfolio composition. Perhaps even more difficult would be to apportion the personal sector share of these assets. We have not attempted any such estimates.

3.8 Unfunded Pension Obligations

In a series of reforms, state pension rights have been extended since 1989 from the white population only, to all races. Case and Deaton (1998) have examined the microeconomic impact of these reforms using survey data. These state pensions are means-tested, and in 1993 were around three times median adult income for the black population. The overwhelming majority of black South Africans of pensionable age are eligible for these benefits. A measure of their importance can be seen in the doubling of current grants to households from government as a proportion of non-property income, from 5 percent in 1985-89, to 10 percent in 1995-6. The discounted present value of these rights must remain uncertain, however, as it depends on government policy and the state of government finances.

Occupational pension rights are often in the form of defined-benefits, sometimes funded, and sometimes unfunded. Poterba (1987) claims that about three-quarters of U.S. corporate pension plans are defined-benefit, independent of the corporate pension plans' asset

[9] One of the few available statistical indicators is the size of bank deposits by unincorporated businesses. At the end of 1997, the ratio of these deposits to those of individuals was around 18 percent, while the ratio to total bank deposits was around 6 percent

position. Bulow (1982) discusses the considerable difficulties in valuing these rights or liabilities. In the UK, government statisticians have produced estimates of corporate and state pension rights back to the late 1970s, using demographic information, detailed Inland Revenue information about pension contributions and payments, and company information (see Stewart, 1991). A similar exercise would be worth carrying out for South Africa, but is beyond the scope of this paper. The Mouton Commission (1992), and, more recently, the Smith Commission (1995), have discussed the structure and reform of pensions in South Africa.

3.9 Consumer Durables

Finally, we turn to the measurement of consumer durables stocks. Current United Nations guidelines recommend that consumer durables should be shown only as a memorandum item, and not included in personal sector net wealth estimates. Nevertheless, estimates of consumer durables stocks are helpful in understanding the behaviour of expenditures on durables. Further, some economists prefer to measure consumption as the expenditure on non-durables and services, plus the depreciation rate times the stock of durables. The SARB assumes a ten year depreciation period for furniture, eight years for transport equipment and five years for other durable goods, as well as linear depreciation schedules (see Van der Walt and Prinsloo, 1993). However, for simplicity, we have assumed a geometric depreciation of four percent per quarter for all durables, implying a similar average half-life. The stock is estimated from the simple form of the perpetual inventory method,

$$S_t = 0.96\ S_{t-1} + cd_t$$

where S is the end of quarter stock, and cd is the flow of durables purchases at constant prices. Multiplying by the current price index gives market price estimates.

4. The Changing Composition of Personal Wealth Sector

We now chart quarterly ratios of the main assets to annualised seasonally-adjusted non-property personal disposable income. Figure 1 shows the estimates for debt, directly-held securities, pensions and housing wealth. Figure 2 shows liquid assets, and total net wealth excluding consumer durables. Figure 1 reveals that, until the mid 1980s, housing wealth accounted for over 60 percent of measured personal sector wealth, excluding consumer durables. However, since the early 1980s, the pension wealth to income ratio has been rising strongly while that of housing has been in decline, so that pension wealth has exceeded housing wealth since the early 1990s. The rise in the debt to income ratio in the 1980s coincided with a fall in the liquid asset to income ratio. The ratio to income of directly-held securities (including unit trusts) has risen significantly since the late 1980s, but remains very small compared to the pension wealth to income ratio. Defining net wealth as liquid assets minus debt plus housing wealth plus directly-held securities and pensions, we see little long-term trend in this ratio to income, though it does reflect fluctuations in the key housing and pension components. The stock of consumer durables at current market prices relative to income also shows little long-term trend, see Figure 3.

Some insights into the patterns are obtained by charting asset to income ratios against corresponding real asset price movements. Figure 3 plots the housing wealth to income ratio

against the house price index divided by the overall consumption deflator. This suggests that most of the rise in the early 1980s and the subsequent decline in the housing wealth to income ratio can be accounted for by the rise and subsequent decline in the real house price index. Figure 3 also plots the durable stock to income ratio against the price of durables divided by the overall consumption deflator. This suggests that in market value terms, declines in real purchases following negative shocks, such as the onset of trade sanctions from 1984, were more than compensated for by rises in relative prices, themselves affected by sanctions.

Figure 4 plots the ratios to income of directly-held securities and of pension assets, against the JSE all share price index and a 13 year bond price index (constructed as explained in Section 2 above), both indices deflated by the consumption deflator. This suggests that short-term fluctuations in these asset holdings, such as the declines in 1974 and 1987, can be accounted for by fluctuations in the key real asset prices. However, the upward drift in these asset to income ratios cannot be accounted for by real asset prices.

Further clues both to the behaviour of asset to income ratios and of some of the real asset prices can be found by examining various rates of return. The real after-tax return on liquid assets for an average tax payer has been negative from the early 1970s to the early 1990s, apart from a brief spell in 1984-5. In Figure 5, this return is measured by

$$r_l(1\text{-}mt) - \Delta_4 lnpc_{+1}$$

where r_l is the 4-quarter moving average of the interest rate on three month bank deposits (as a percentage divided by 100), mt is the average of marginal tax rates faced by households (see Prinsloo, 1994), and $\Delta_4 lnpc_{+1}$ is the annual rate of inflation looking one quarter ahead, measured by the consumer expenditure deflator.[10] The weighted average of marginal tax rates rose from around ten percent in 1970 to over 30 percent in the 1990s. The move to less negative and then positive real returns in the 1990s is associated with the stabilisation and then recovery of the liquid asset to income ratio in the same period (Figure 2). Similarly, the brief interregnum of less negative real returns in the early 1980s is associated with an interruption in the decline in the liquid asset to income ratio in the same period.

The reasons seem clear enough. If asset returns are simply reinvested, and no new money is put in or taken out,

$$A_t = A_{t-1}\,(1+r_t)$$

where A is the level of real assets and r is the real return. Negative real interest rates will reduce real assets unless new money is invested. But the incentive to do so is reduced by the prospect of negative real returns.

Figure 5 also displays the real interest rate on mortgage borrowing, this being the largest element in consumer debt. South Africa has no tax relief on borrowing, whether for mortgage or non-mortgage credit. This real interest rate is measured by

$$r_m - \Delta_4 lnpc_{+1}$$

where r_m is the four quarter moving average of the nominal mortgage interest rate. Note that, as in the UK, floating rate mortgage loans are the norm in South Africa. The positive

[10] We prefer this measure to the consumer price index, in which mortgage costs, influenced by nominal interest rates, measure housing costs of owner-occupiers.

correlation between the real interest rate on borrowing in Figure 5 and the debt to income ratio in Figure 1, particularly since 1980, is striking. This is likely to be the result of two factors. The first factor is inflation, which tends to be correlated with negative real returns, and also with a fall in the value of nominal debt outstanding to nominal income. The second factor is financial liberalisation. The removal of quantitative controls over credit in the early 1980s, associated with a move to controlling credit expansion via higher interest rates, induces a positive correlation between a supply-driven credit expansion and higher interest rates. This phenomenon has also been observed in other countries, such as the UK and in Scandinavia, which underwent financial liberalisation in the 1980s (see Berg, 1994 and Lehmusaari, 1990).

Real borrowing costs obviously have an impact on the housing market, in part because they are such an important ingredient in the rate of return in housing. Suppose the purchase of a house is financed with a 60 percent loan (i.e. a 60 percent loan-to-house value ratio). Then the return on the 40 percent of the value represented by the household's own funds, consists of the capital appreciation, plus the imputed rent, minus the interest cost divided by the funds committed, less the inflation rate. This can be approximated by

$$(\Delta_4 lnhp_{+1} + ir - 0.6r_m)/0.4 - \Delta_4 lnpc_{+1}$$

where $\Delta_4 lnhp_{+1}$ is the annual rate of house price inflation, looking one quarter ahead, ir is the rate of imputed rent - here taken to be 0.03, r_m is the four quarter moving average mortgage interest rate, and $\Delta_4 lnpc_{+1}$ is the annual inflation rate looking one quarter ahead, as above. This is plotted in Figure 5. The correlation of this rate of return with the ratio of housing wealth to income and the real house price index in Figure 3 is likely to be partly causal[11], and partly due to joint determination, since house price booms, whatever their cause, are associated both with positive returns and high house prices.

An increasing fraction of directly-held securities and pensions has been invested in equities. The equity return is therefore likely to help account for some of the rise in these asset to income ratios, though the decision not to restrict official pension funds to invest only in public fixed interest securities as from 1990, also contributed. South Africa has no capital gains tax. Pension funds are exempt from income tax while directly-held securities are not. The real return on a pension fund invested in the average portfolio, priced in the JSE all share index, can be measured as

$$\Delta_4 lnpjse_{+1} + dy - \Delta_4 lnpc_{+1}$$

where pjse is the average JSE all share index, dy is the dividend yield (a percentage divided by 100) and pc is the overall consumer expenditure deflator, as above. For the corresponding return on directly-held securities whose dividend income is taxed, replace dy by dy(1-mtd), where mtd is the average of marginal tax rates on dividends. Again, the correlation between these returns and the rising ratios to income of assets in pensions and directly-held securities in Figure 1 is likely to be partly causal and partly due to joint determination, since real capital

[11] With extrapolative expectations, one can replace expectations of $\Delta_4 lnhp_{+1}$ and $\Delta_4 lnpc_{+1}$ by lagged values. The resulting measure still shows a positive correlation with the housing wealth to income ratio and the real house price index. A full econometric model for house prices would also incorporate income and wealth effects, demography and housing supply, as well as handling expectations issues, see Muellbauer and Murphy (1997).

gains will be correlated with high real share price indices, whatever the cause of higher share prices.

Since the early 1980s, returns on equities have tended to outperform returns in housing, liquid assets and fixed interest securities. Equity returns therefore appear to have a strong association with shifts in the portfolio composition of personal sector wealth. This is consistent with the shift from personal saving to corporate saving which occurred in the 1980s, and has been discussed by Barr and Kantor (1994), Prinsloo (1997) and Tsikata (1998). These authors emphasise the impact of the tax on dividends in the context of relatively high rates of inflation and the absence of a capital gains tax. Between 1960 and 1990, dividends on directly-held equities were effectively taxed twice: once through corporation tax on company profits (out of which dividends are paid); and secondly through a dividend tax on individuals at two thirds of their marginal tax rate.[12] The dividend tax was temporarily abolished in 1990-93, and then replaced by a secondary dividend tax on companies. This change, together with inflation, which raises untaxed nominal capital gains relative to taxed dividends, created an obvious incentive for earnings to be retained. Figure 6 plots the relative after-tax income from dividends versus retained earnings, called the 'tax discrimination variable' by Poterba.[13] In fact, since there are no capital gains taxes in South Africa, this variable is just 1-mtd, where mtd is the average of marginal dividend tax rates on investors, though in Figure 6 we use the highest marginal dividend tax rate in place of mtd. The tax rate is measured as the four quarter moving average of the rates holding over each financial year, April to March. Figure 6 also shows the total equity return on equities held by pension funds (where dividends are untaxed), and the return on directly-held equities. The difference between the two is small, since dividends have been a relatively small component of total returns.

While it seems natural to help explain the shift from personal to corporate saving in these terms, the importance of the dividend tax should not be exaggerated for two reasons. First, note that around 90 percent of equities held on behalf of the personal sector are held by pension funds and are tax-exempt. When pensions are paid out to individuals they become subject to income tax. However, since pension income is received at a time when other income is low or non-existent, low marginal tax rates will tend to apply.[14] Moreover, because many occupational pensions are of the defined-benefit form, though backed by pension funds, they have only a loose association with current asset values and hence with current dividend policies.

Thus, it will make no difference to future pensioners to what extent the pension funds accumulated on their behalf come from (tax-free) accumulated dividends and to what extent they are from capital gains resulting from retained earnings. From this narrow point of view, dividend policy is irrelevant. The second reason is given by the relatively small differences in total returns due to the dividend tax (see Figure 6). Together these reasons suggest that tax discrimination applying to the small share of directly-held equities is insufficient alone to explain the shift from personal saving to corporate saving.

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[12] To be precise, one third of dividends were untaxed, and the remaining two thirds were taxed at the individual's marginal income tax rate.

[13] See Poterba (1991) for comparable data for the US, UK and Canada.

[14] It is difficult enough to measure tax rates for current pensioners, let alone to forecast them over the average life of future pay-outs associated with current pensions.

5. Conclusions

We have constructed the first set of reasonably comprehensive estimates at market values of aggregate personal sector wealth holdings in South Africa. Relative to non-property disposable income, liquid assets have declined since the early 1980s, though some recovery has taken place since the early 1990s, with the rise in short-term real interest rates. Household debt, both mortgage and non-mortgage debt, has risen relative to income since the early 1980s. At least part of the rise seems to have been associated with financial liberalization. Directly-held securities, increasingly in the form of equities, have risen in value relative to income, though remain small compared with pension wealth, which has experienced the most dramatic rise relative to income and also a shift toward equities. Plotting these time profiles against real asset prices and after-tax rates of return gives useful insights into the forces at work. Real equity prices have tended to rise and the return on equities has been generally positive since the early 1980s (despite setbacks such as occurred in 1987), while returns in fixed interest securities have been much weaker. The influence of tax policy on these returns has been both direct and indirect through the effect on corporate dividend policy. The most important features of tax policy are the absence of capital gains tax and the presence, for the most part, of a dividend tax on individuals, but not on institutions such as pension funds. These features encourage the retention of corporate profits and encourage individuals to hold equities as part of pension wealth. However, the reduction in dividend taxation since 1990 has boosted direct share ownership, particularly in the form of mutual funds.

Housing wealth has historically dominated personal sector wealth, but was overtaken by pension wealth in the early 1990s. The housing wealth to income ratio has declined since 1984, a decline which can be accounted for in part by the fall in real house prices and relatively poor returns from housing investment, though, no doubt, these in turn can be explained by sluggish income growth, terms of trade shocks, the supply response and other factors, such as emigration.

The biggest lacunae in the personal sector wealth estimates concern ownership of foreign assets - made difficult or illegal by capital controls, the assets of unincorporated business enterprises, and public and occupational defined-benefit pension rights. More work is needed in these areas. Nevertheless, the estimates we have assembled play an important role in explaining variations in consumer expenditure in South Africa from 1970, as demonstrated in Aron and Muellbauer (1998). It also seems likely that the behaviour of broad money aggregates, at least those held by the personal sector, cannot be well understood without taking into account variations in the market value of personal sector wealth.

It would be highly desirable for the Reserve Bank itself to construct and publish market value wealth estimates. The effort to do so is likely, for some assets, to improve the accuracy of the flow of funds estimates. It should also serve to focus the attention of policy-makers on the macroeconomic wealth effects of interest rate policy and fiscal policy, which may, in the past, not have been given their full due.

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Fig 1: Constructed Asset Stocks

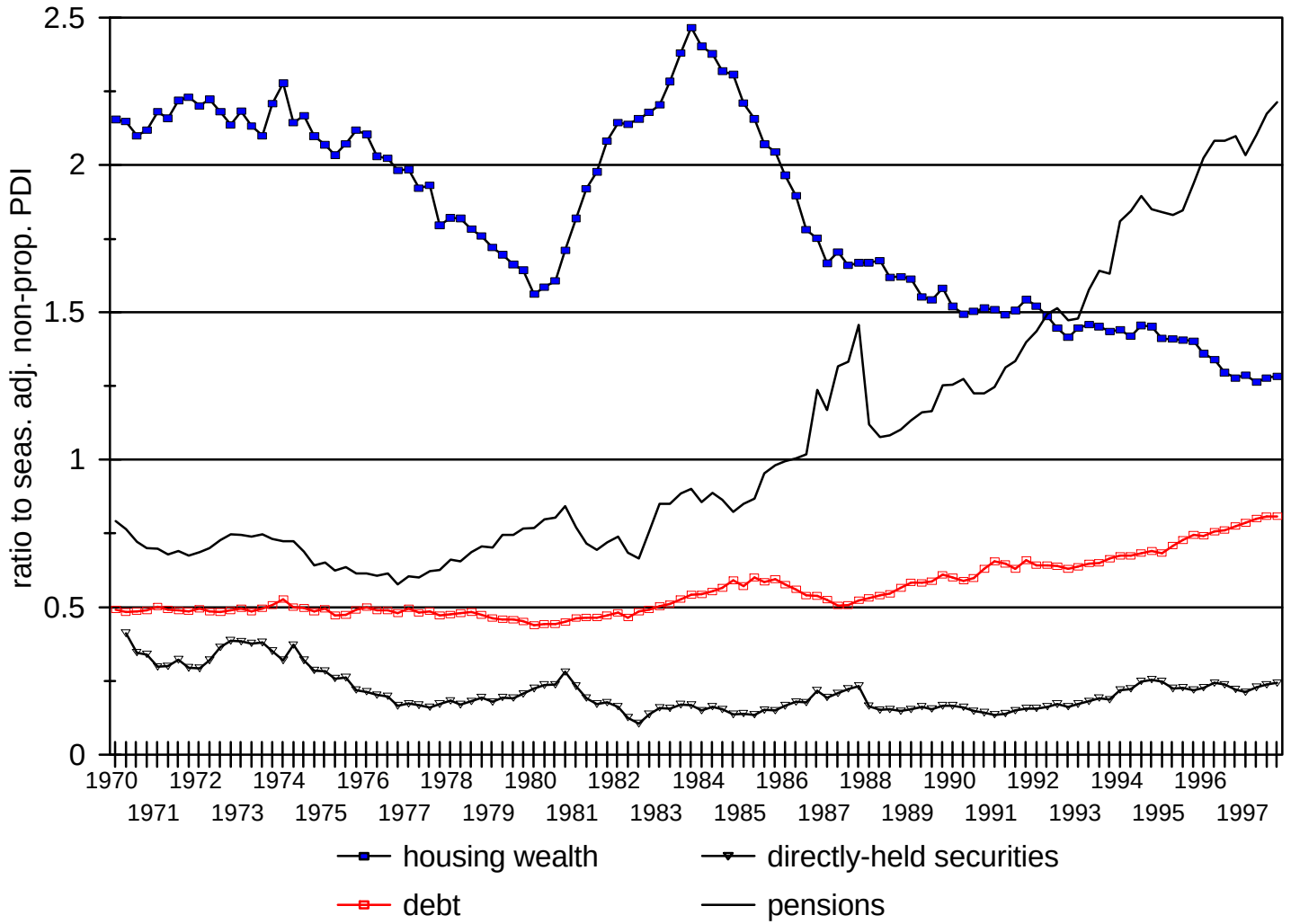

Fig 2: Constructed Asset Stocks

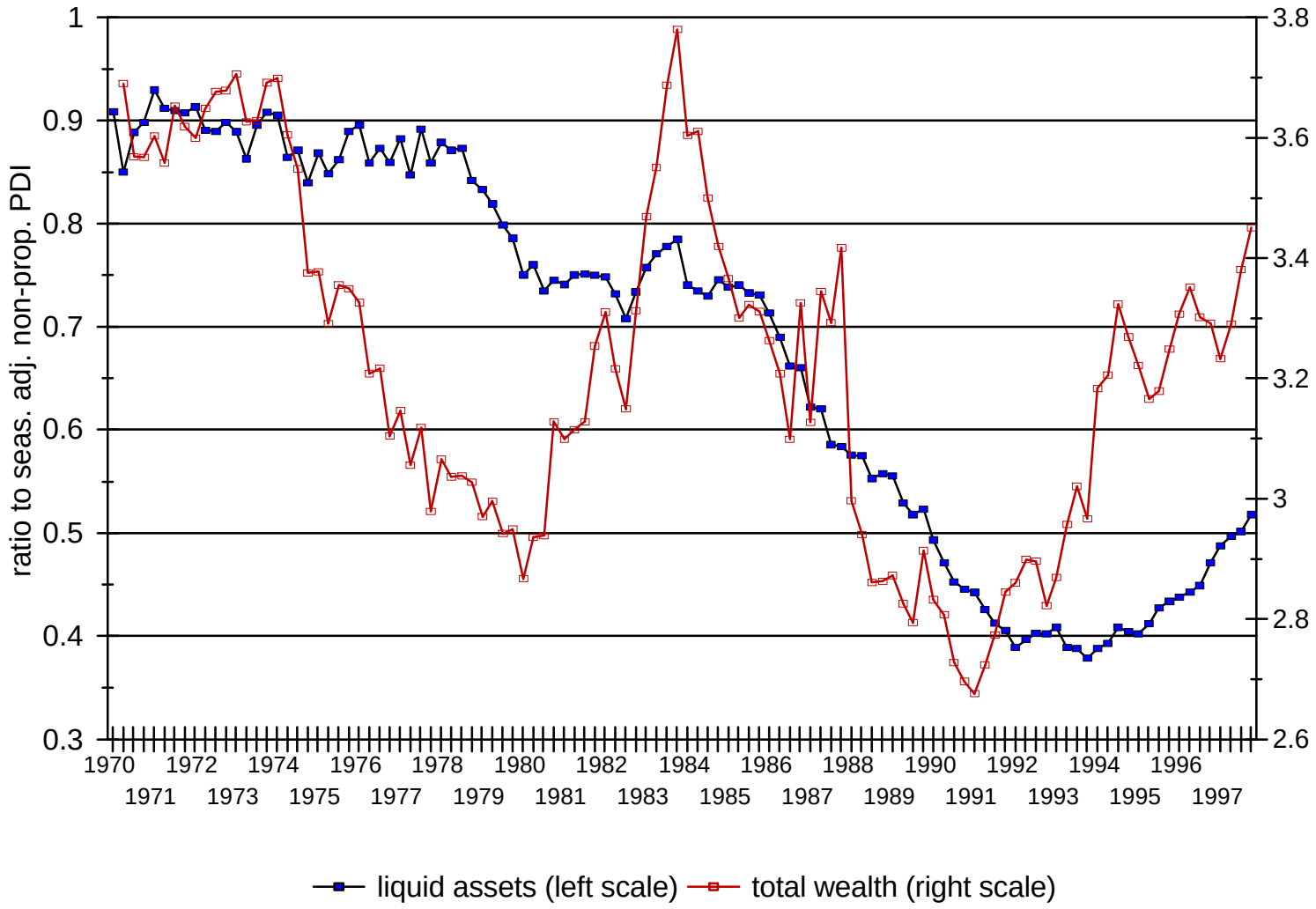

Fig 3: Asset Stocks and Real Prices

Housing and Durables

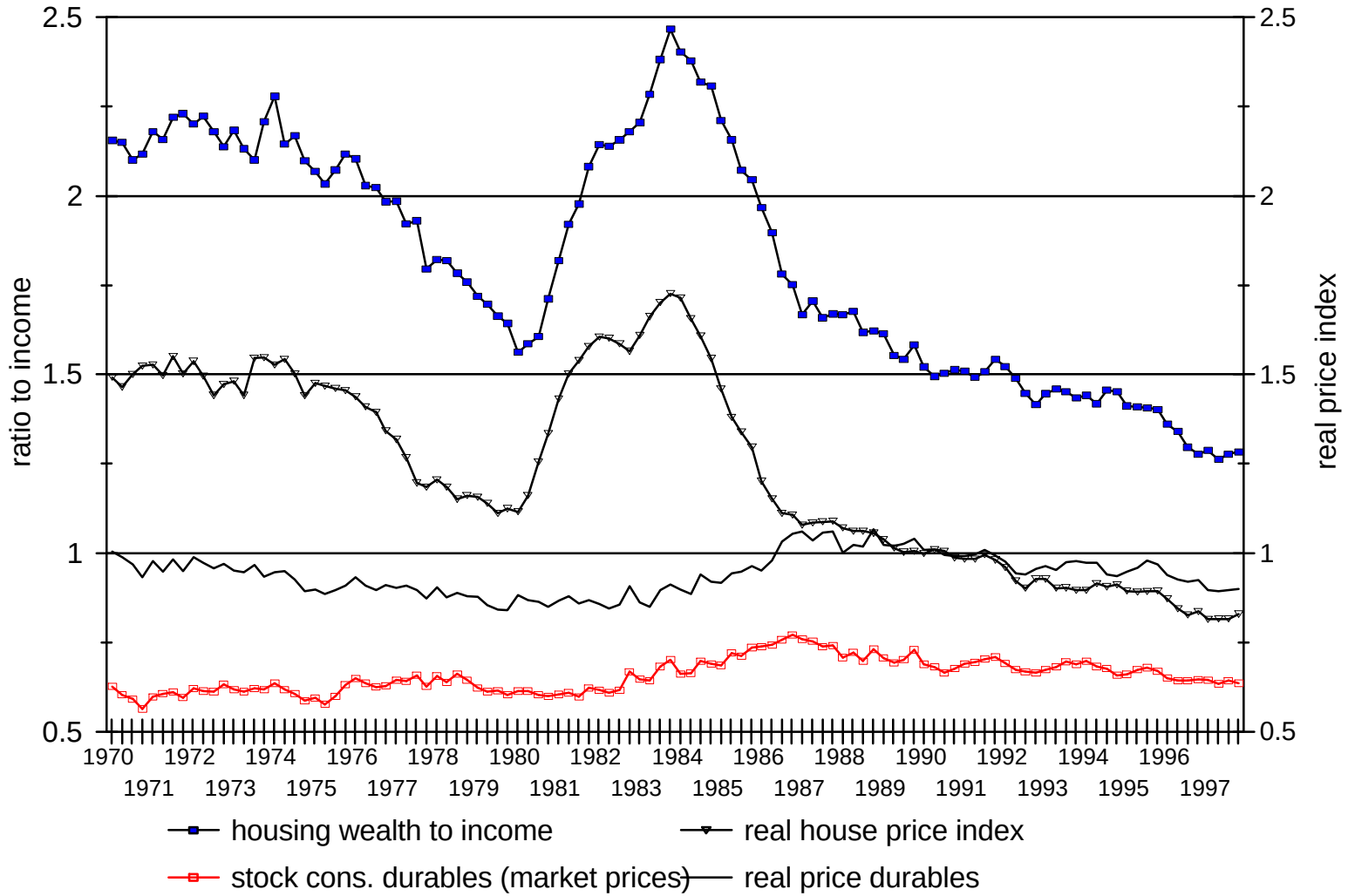

Fig 4: Asset Stocks and Real Prices

Securities and Pension Assets

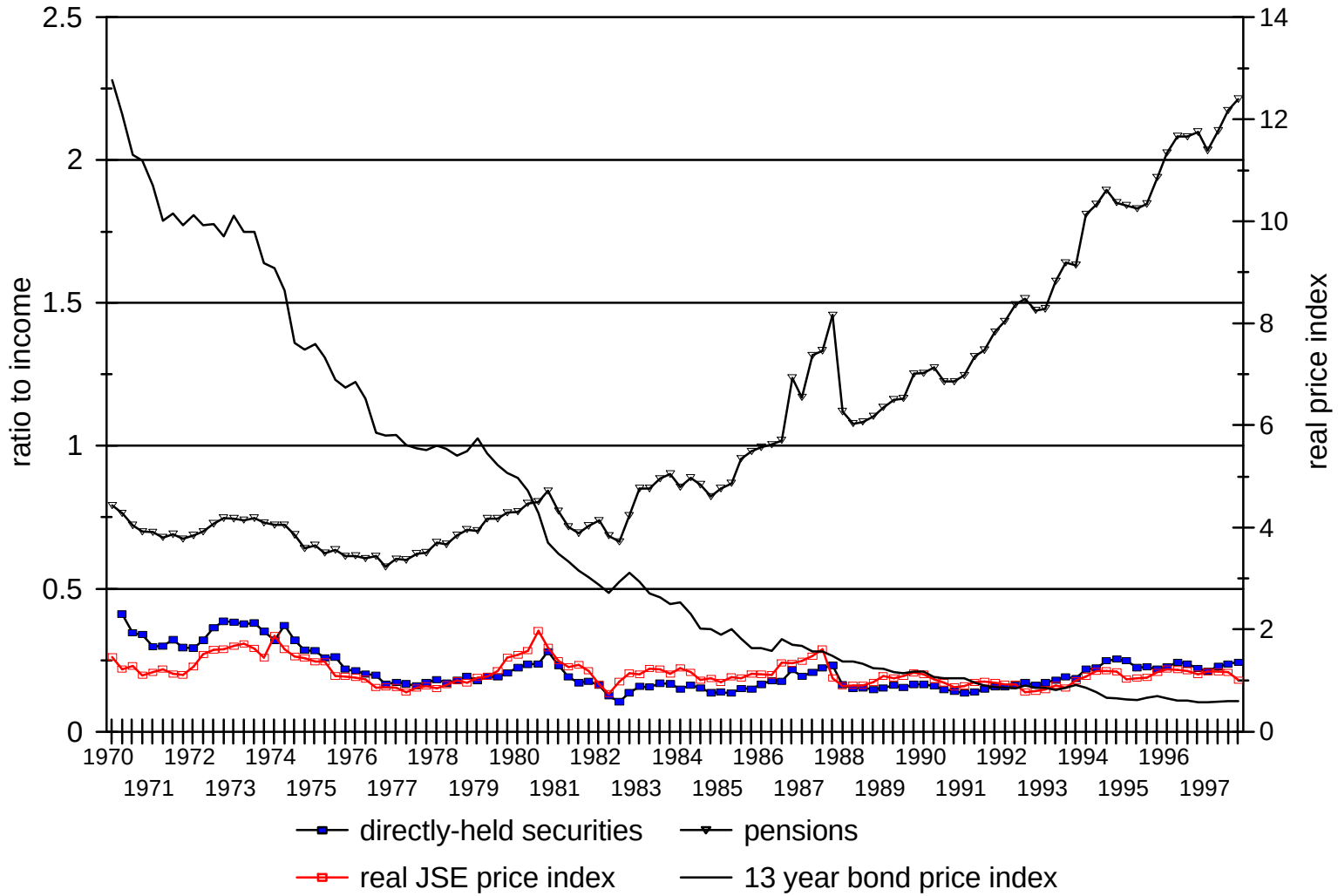

Fig 5: Rates of Return

Liquid Assets, Mortgages, Housing

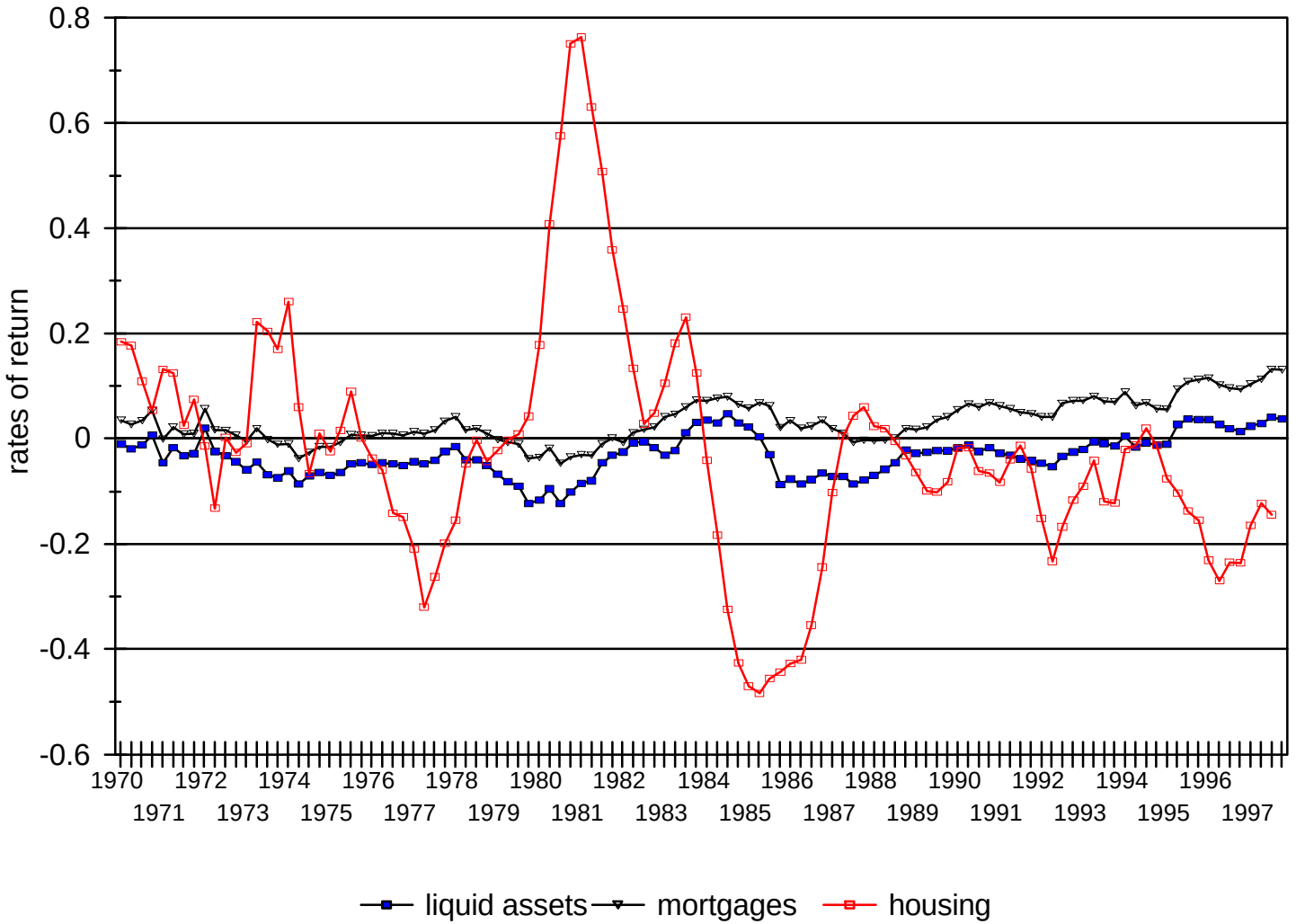

Fig 6: Rates of Return

Equities: Pensions and Directly-held